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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/677,850	10/02/2003	Jeffrey Raynor	03EDI22652634	5132

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EXAMINER

SINES, BRIAN J

ART UNIT	PAPER NUMBER
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1743

MAIL DATE	DELIVERY MODE
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05/04/2007

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

## Office Action Summary

Application No.

10/677,850

Applicant(s)

RAYNOR ET AL.

Examiner

Brian J. Sines

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 05 March 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 39-41, 43-58 and 60-65 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 39-41, 43-58 and 60-65 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 39 – 41, 43 – 58 and 60 – 65 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 39 – 41, 43 – 58 and 60 – 65 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential structural cooperative relationships of elements, such omission amounting to a gap between the necessary structural connections. See MPEP § 2172.01. The omitted structural cooperative relationships are:

Regarding claims 39 and 57, it is unclear as to how the newly recited respective landing feature facilitates the aligned attachment of the sensor to the mounting substrate. It is unclear as to how the landing is cooperatively associated with the bump bond during attachment. Is the landing located on the mounting substrate or the housing to guide the alignment of the component parts during attachment? A feature that is taught as critical in the specification should be clearly recited in the claims (see also MPEP § 2164.08c).

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

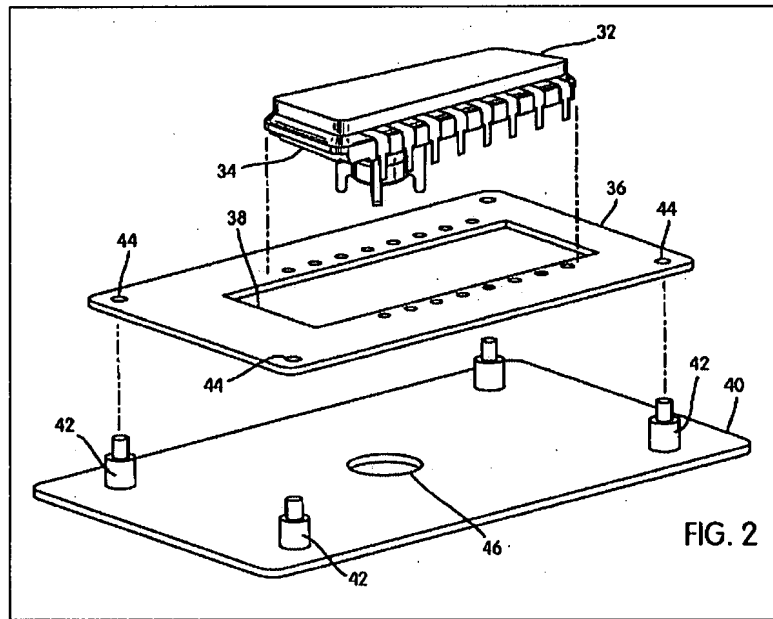
(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

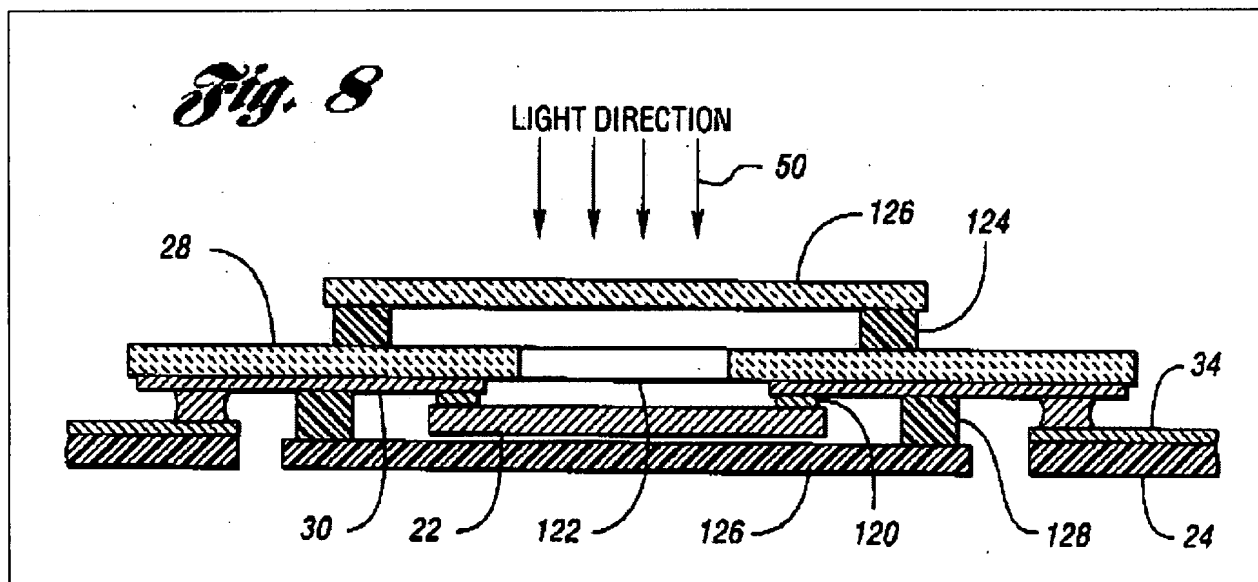
1. Determining the scope and contents of the prior art.
  2. Ascertaining the differences between the prior art and the claims at issue.
  3. Resolving the level of ordinary skill in the pertinent art.
  4. Considering objective evidence present in the application indicating obviousness or nonobviousness.
1. Claims 39 – 41, 43, 44, 46, 48 – 50, 52 – 54, 57, 58, 60, 61 and 63 – 65 are rejected under 35 U.S.C. 103(a) as being unpatentable over Venkat et al. (U.S. Pat. No. 6,462,330 B1) (hereinafter “Venkat”) in view of Bauer et al. (U.S. Pat. No. 6,130,448 A) (hereinafter “Bauer”) and Casson et al. (U.S. Pat. No. 5,349,500 A) (hereinafter “Casson”).

Regarding claims 39 – 41, 46, 48 – 50, 52, 53, 57 and 58, Venkat teaches a method for attaching a sensor (optical sensor IC 32 with an integrated aperture plate 34) comprising a sensing face, a sensor or image sensing area (e.g., lens 56), signal output contacts and a housing (base plate 40) comprising an extended formation (alignment posts 42) to opposite sides of a mounting substrate (printed circuit board (PCB) 36 having additional openings (alignment apertures 44)) having an opening therethrough (38). Venkat teaches that the device components are positioned and aligned during device assembly (see col. 3, lines 1 – 62; figures 2 – 9).



Venkat does not specifically teach the use of bump bonding for facilitating the attachment of the sensor to the mounting substrate.

Bauer does teach the use of bump bonding using solder bump 120 in attaching an optical sensor 22 to a mounting base substrate 28 that comprises circuitry (e.g., conductive strip 30) (see, e.g., col. 10, line 61 – col. 11, line 10; col. 12, lines 41 – 59; figure 8). As shown in figure 8, the optical sensor 22 is aligned and mounted on the substrate 28 comprising opening 122.



Furthermore, Casson teaches the attachment of a chip device to a flexible printed circuit board using solder bumps to facilitate a secure electrical connection (see, e.g., Abstract). Casson teaches the self-alignment of the chip device to the mounting substrate comprising a flexible printed circuit board using a solder bump bonding methodology that also comprises a heating step (see, e.g., col. 16, lines 52 – 68).

Consequently, as indicated by Bauer and Casson, a person of ordinary would accordingly have had a reasonable expectation for success in using bump bonding in facilitating the aligned attachment of the components of the disclosed sensor device. The prior art can be modified or combined to reject claims as *prima facie* obvious as long as there is a reasonable expectation of success (see MPEP § 2143.02). Therefore, it would have been obvious to a person of ordinary skill in the art to use bump bonding with the disclosed methodology as claimed to facilitate effective and secure alignment and attachment of the components of the device.

Regarding claims 43 and 60, it would have been obvious to a person of ordinary skill in the art to incorporate a plurality of duplicate bump bonds around the perimeter of the opening in

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order to provide for a secure alignment and attachment of the optical sensor and mounting substrate. The mere duplication of parts, without any new or unexpected results, is within the ambit of one of ordinary skill in the art (see MPEP § 2144.04).

Regarding claims 44 and 61, Bauer teaches that the optical sensor 22 is aligned to base substrate 28, 140 and all solder joints are made simultaneously by reflowing solder bump 120 (see col. 12, lines 40 – 51). Casson also teaches the self-alignment of the chip device to the mounting substrate comprising a flexible printed circuit board using a solder bump bonding methodology that also comprises a heating step (see, e.g., col. 16, lines 52 – 68). Therefore, it would have been obvious to a person of ordinary skill in the art to heat the bump bonds so that the sensor would become aligned and then subsequently fixed with the mounting substrate.

Regarding claim 54, the use of threaded connections are well known in the art. Therefore, it would have been obvious to a person of ordinary skill in the art to employ the use of threaded connections during the assembly of the disclosed device as claimed.

2. Claims 45 and 62 are rejected under 35 U.S.C. 103(a) as being unpatentable over Venkat, Bauer and Casson in view of Glenn (U.S. Pat. No. 5,949,655 A) (hereinafter “Glenn”).

Regarding claim 45 and 62, Venkat and Bauer do not specifically teach the incorporation of a CCD device. Glenn further teaches a sensor device comprising a charge coupled device (CCD) incorporated with an integrated circuit (see, e.g., col. 1, lines 39 – 55). A charge coupled device is considered functionally equivalent to the optical sensing device that is incorporated with the device disclosed by Venkat (see MPEP § 2144.06). The Courts have held that an express suggestion to substitute one equivalent component or process for another is not necessary to render such a substitution obvious. See *In re Fout*, 675 F.2d 297, 213 USPQ 532

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(CCPA 1982). Thus, it would have been obvious to a person of ordinary skill in the art to incorporate a CCD device with the device disclosed by Venkat and Bauer.

3. Claim 47 is rejected under 35 U.S.C. 103(a) as being unpatentable over Venkat, Bauer and Casson in view of Bidiville et al. (U.S. Pat. No. 5,854,482 A) (hereinafter “Bidiville”).

Regarding claim 47, Venkat and Bauer do not specifically teach the use of a photodiode array. Bidiville does teach a device using an optical sensing system incorporating the use of a photodiode array (see col. 9, lines 9 – 34). A photodiode array is considered functionally equivalent to the optical sensing device that is incorporated with the device disclosed by Venkat (see MPEP § 2144.06). The Courts have held that an express suggestion to substitute one equivalent component or process for another is not necessary to render such a substitution obvious. See *In re Fout*, 675 F.2d 297, 213 USPQ 532 (CCPA 1982). Thus, it would have been obvious to a person of ordinary skill in the art to incorporate a photodiode array system with the device as claimed.

4. Claims 55 and 56 are rejected under 35 U.S.C. 103(a) as being unpatentable over Venkat, Bauer and Casson in view of Groger et al. (U.S. Pat. No. 6,300,638 B1) (hereinafter “Groger”).

Regarding claims 55 and 56, Groger teaches a biological sensing system incorporating the use of an optical sensor (e.g., photodiode/amplifier package 23) with a matter delivery system (e.g., inlet 36, outlet 38 and cavity 34) (see figures 1 and 4). The photodiode optical sensing system is considered functionally equivalent to the optical sensing device that is incorporated with the device disclosed by Venkat (see MPEP § 2144.06). The Courts have held that an express suggestion to substitute one equivalent component or process for another is not necessary to render such a substitution obvious. See *In re Fout*, 675 F.2d 297, 213 USPQ 532



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(CCPA 1982). Thus, it would have been obvious to a person of ordinary skill in the art to incorporate the optical detection system with the disclosed device as claimed.

***Response to Arguments***

Applicant's arguments with respect to the present claims have been considered but are moot in view of the new ground(s) of rejection.

***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

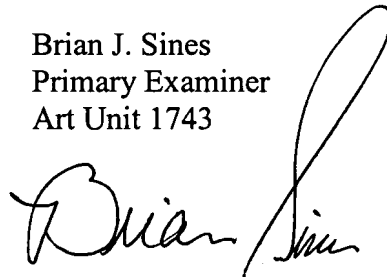
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian J. Sines, Ph.D., whose telephone number is (571) 272-1263. The examiner can normally be reached on Monday - Friday (11 AM - 8 PM EST).

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jill A. Warden can be reached on (571) 272-1267. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Brian J. Sines  
Primary Examiner  
Art Unit 1743

A handwritten signature in black ink, appearing to read "Brian Sines", with a large, stylized loop at the end of the last name.